

Frullania pran-nathii – a New Epiphyllous Liverwort from Darjeeling, India

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A new species of genus *Frullania* Raddi, *F. pran-nathii* M. Dey & D. K. Singh is described from Darjeeling in the Eastern Himalaya, India. It is characterized by greenish brown plants with small, thick-walled cortical cells arranged in a single layer and thin-walled medullary cells with minute tri-radiate trigones; widely spreading, contiguous to distant, suborbicular to elliptical leaves with plane lobe, a large auriculate appendage at base and flat apex; median leaf cells with small trigones and nodular intermediate thickenings; basal leaf cells with trabeculately thickened trigones and intermediate thickenings; stylus multicellular at base with 1–3 teeth lateral tooth and 5–7 cells uniseriate towards apex terminating into an elongated hyaline cell, and 1/8–1/5 bilobed, distant underleaves with auriculate base. The species has been compared with *F. nepalensis* (Spreng.) Lehm. & Lindenb., from which it differs in the shape and arrangement of leaves, and size and structure of stylus.

Key words: Darjeeling, epiphyllous, *Frullania pran-nathii*, India, new species.

In terms of species diversity, the genus *Frullania* Raddi with about 63 species (Nath 2002, Srivastava and Alam 2002, 2004, Singh and Nath 2004, Singh and Singh 2005, Nath and Singh 2006) is the second largest genus of liverworts in India. The East Himalayan bryogeographical region of the country comprising the eight North-eastern states, accounts for the maximum diversity with about 40 species of the genus represented in this region (Singh 1997, Singh and Nath 2004, Nath and Singh 2006). Its other major centers of diversity in India are the Western Himalayan region which harbours about 19 species (Singh and Singh 2005) and the Western Ghats with 17 species (Singh 1997). During the course of a study on the

epiphyllous liverworts of the Eastern Himalaya, comprising Darjeeling Sub-division of West Bengal, and the States of Sikkim and Arunachal Pradesh, the authors came across an interesting population of the genus. A cursory examination of the specimens suggested them to be similar to *F. nepalensis* (Spreng.) Lehm. & Lindenb. But, subsequent morpho-taxonomic investigation on the specimens revealed the plants to be distinct from all the hitherto known species of the genus. Study of authentic specimens of *F. nepalensis* [Hepaticae Selectae et Criticae (ed. Fr. Verdoorn), ser. I, 1930, Malaccan Peninsula, Cameroon Highlands, ca. 1700 m, 1930, R. E. Holttum 33 (CAL); Hepaticae Selectae et Criticae (ed. Fr.

Verdoorn), ser. IX, 1936, Sumatra, Atjeh, Boer in Telong, 2100 m, 1934, C. G. G. J. van Steenis 414 (CAL)] confirmed that our plants were distinct from the former. Hence the same has been illustrated and described here as a new species.

Frullania pran-nathii M. Dey & D. K. Singh, sp. nov. [Fig. 1]

Frullaniae nepalensi (Spreng.) Lehm. & Lindenb. affinis, sed foliis contiguis-distantibus, lobis foliorum planis et foliis apicibus planis; stylis basibus multicellularibus et apicibus uniseriatis 5–7-cellularibus, cellulis 1–3-dentatis, una cellula hyalina desinanti differt.

TYPE: INDIA: Eastern Himalaya, West Bengal, Darjeeling district, 2 km from Lava towards Algarah, alt. ca. 2100 m, 15 January 2005, D. Singh & M. Dey 36108A (CAL–holotype).

Other specimens examined: Ditto. D. Singh & M. Dey 36099, 36100, 36103 (CAL).

Plants greenish brown in herbarium, prostrate, closely appressed to the upper surface of leaves; shoot 25.0–40.0 × 1.7–2.3 mm; branches arising from the ventral segment of the lateral merophyte so as the lobule of its subtending leaf absent – hence ‘*Frullania*-type’. Stem oval-elliptical in outline in cross-section, 0.18–0.27 × 0.16–0.21 mm, 12–14 cells across; cortical cells in a single layer, 8.75–17.5 × 5.0–12.5 µm, thick-walled; medullary cells in several layers, much larger than cortical cells, 12.5–25.0 × 10.0–20.0 µm, thin-walled with minute triradiate trigones. Leaves contiguous to distant, widely spreading; leaf lobe suborbicular to elliptical, 1.1–1.5 × 0.9–1.2 mm, apex rounded, margin entire, dorsal margin strongly arched with a large auriculate appendage at base, ventral margin almost straight–slightly arched; marginal leaf cells subquadrate to rectangulate, 12.5–25.0 × 10.0–17.5 µm, walls with small trigones and nodular intermediate thickenings; median

leaf cells polygonal, 20.0–30.0 × 12.5–20.0 µm, walls with small trigones and nodular intermediate thickenings; basal leaf cells elongated, polygonal, 32.5–52.5 × 12.5–22.5 µm, walls with trabeculately thickened trigones and intermediate thickenings; leaf lobule small, cucullate, 1/5 of lobe length, 0.2–0.3 × 0.17–0.26 mm, apex rounded, beak absent; stylus highly differentiated with a multicellular base, 5–7 uniseriate cells at apex, bearing 1–3 teeth, all of them ending in an elongated hyaline cell. Underleaves distant, 3–4 times as wide as stem, 0.55–0.76 × 0.50–0.78 mm, bilobed to 1/8–1/5 of underleaf length, margin entire, base auriculate, sinus narrow to wide. Rhizoids numerous, fasciculate at the base of underleaves, yellowish brown to brown.

Habitat and Ecology: Epiphyllous, growing in moist and shady places on the leaves of *Cinnamomum* sp. in association with *Cheilolejeunea imbricata* (Nees) S. Hatt. and on the leaves of *Quercus* sp.

Etymology: The species has been named after late Padma Shri Prof. P. N. Mehra, for his notable contribution towards the knowledge of Indian botany in general and that of liverworts and hornworts in particular.

Frullani pran-nathii is characterized by the stem which is 12–14 cells across the diameter in cross-section with thick-walled cortical cells arranged in a single layer and thin-walled medullary cells with minute triradiate trigones (Fig. 1, c); widely spreading, contiguous to distant, suborbicular to elliptical leaves with plane lobe, a large auriculate appendage at base and flat apex (Figs. 1, a, d–f); median leaf cells with small trigones and nodular intermediate thickenings (Fig. 1, h); basal leaf cells with trabeculately thickened trigones and intermediate thickenings (Fig. 1, i); highly differentiated stylus with a multicellular base, 5–7 cells uniseriate at apex, bearing 1–3 teeth, ending in an elongated hyaline cell (Figs. 1, j–m); and 1/8–1/5 bilobed, distant underleaves with auriculate

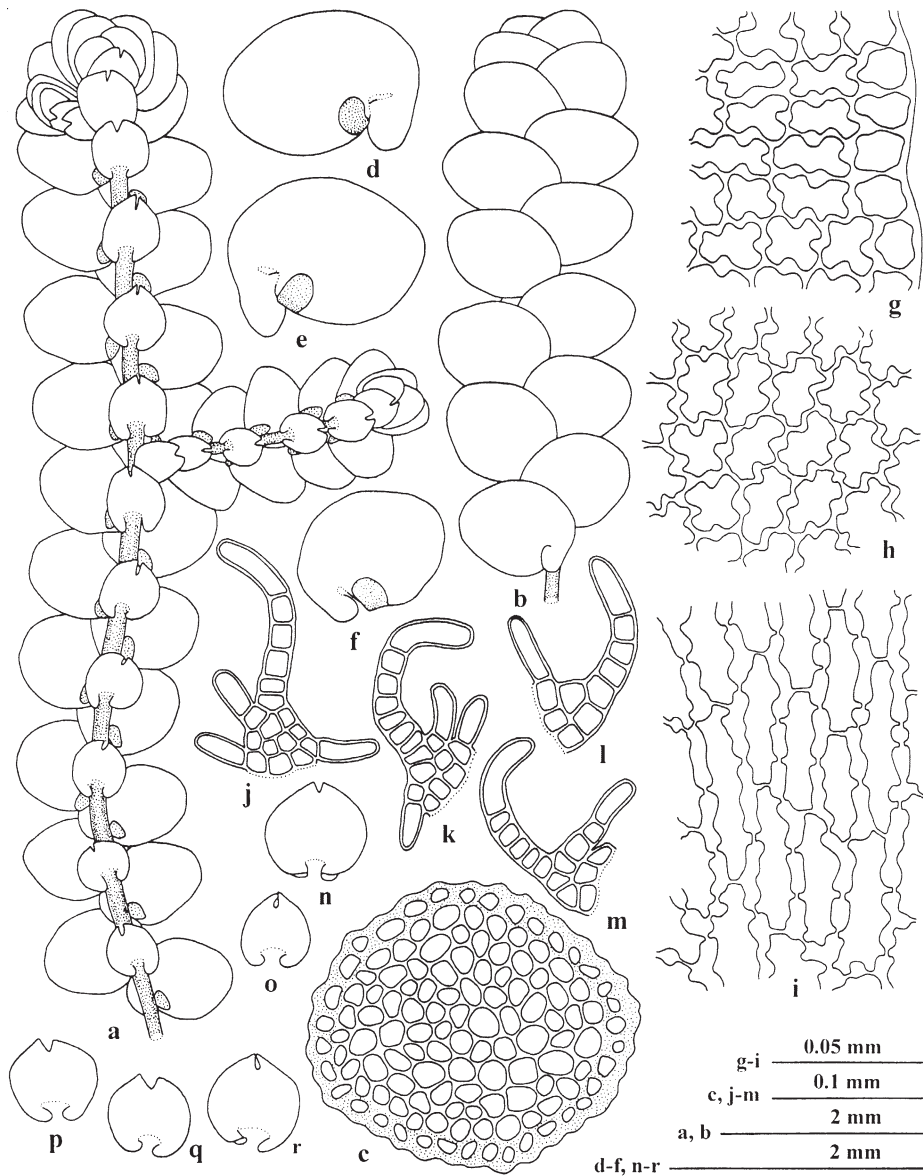


Fig. 1. *Frullania pran-nathii* M. Dey & D. K. Singh, sp. nov. a. A portion of plant in ventral view (rhizoids not shown). b. A portion of plant in dorsal view. c. Cross-section of stem. d-f. Leaves. g. Marginal cells of leaf. h. Median cells of leaf. i. Basal cells of leaf. j-m. Stylus. n-r. Underleaves. All drawn from D. Singh & M. Dey 36108A (CAL).

base (Figs. 1, n–r).

Frullania pran-nathii resembles *F. nepalensis* (Spreng.) Lehm. & Lindenb. in the shape of leaves and lobules and nature of leaf cells. However, the former distinctly differs from the latter which has loosely to densely imbricate leaves with strongly concave lobe and incurved apex and minute, filiform, uniseriate, 3–5 cells long stylus (cf. Kamimura 1961, Hattori 1973, Zhu and So 2001).

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M. デイ^a, D. K. シン^b: インド・ダージリン地方で発見された葉上苔類の新種 *Frullania pran-nathii*

Frullania 属は約63種を有するインドで2番目に大きな苔類の属である。ヒマラヤ東部における調査にて、*F. nepalensis* (Spreng.) Lehm. & Lindenb. に類似するが、これとは区別される苔類を確認したので、これを *F. pran-nathii* M. Dey & D. K. Singh として新種記載した。*F. pran-nathii* は、葉がやや

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円形～楕円形で平たく、基部が大きな耳状で先端が尖らないこと、またスチルスが基部で細胞が多列に並び、先端で5～7細胞が一行に並ぶことで、*F. nepalensis* とは区別される。

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